

CLAIM AMENDMENTS

Underlining denotes added text; strike through and [[]] denote cancelled text.

1-21. **(Canceled)**

22. **(Currently Amended)** A method, comprising:

- a) providing:
 - i) a plurality of reaction vessels having a top and a bottom configured with an aspect ratio of at least 3.3, wherein said ratio is defined as vessel height divided by vessel diameter,
 - ii) a heat source contacting said bottom of said reaction vessels;
 - iii) a cooling means contacting said top of said reaction vessels; and,
 - iv) a solution comprising a plurality of reactants;
- b) introducing said solution into a first reaction vessel comprising a first temperature differential between said top and said bottom, wherein
 - i) said first temperature differential is produced by simultaneously heating said bottom with said heat source and cooling said top with said cooling means,
 - ii) said heating produces spatially uniform temperature and temporally uniform temperature across said fluid in said top of said reaction vessel, and
 - iii) said cooling produces spatially uniform temperature and temporally uniform temperature across said fluid in said bottom of said reaction vessel;
- c) transferring said solution from said first reaction vessel to a second reaction vessel wherein said second reaction vessel comprises a second temperature differential between said top and said bottom; and;
- d) transferring said solution from said second reaction vessel to said first reaction vessel under such conditions that said plurality of reactants form a reactant product.

23. **(Previously Presented)** The method of Claim 22, wherein, in cross section, said reaction vessels are without corners.

24. **(Previously Presented)** The method of Claim 22, wherein, in cross section, said reaction vessels are with corners.

25. **(Original)** The method of Claim 22, wherein said reactants comprise i) nucleic acid comprising a target and ii) primers substantially homologous to at least a portion of said target.

26. **(Canceled)**

27. **(Previously Presented)** The method of Claim 22, wherein said reactant product comprise amplified nucleic acid.

28. **(Previously Presented)** The method of Claim 22, wherein said reaction vessels comprise material selected from the group consisting of Plexiglas™, glass, plastics, silicones and metal.

29. **(Original)** The method of Claim 22, wherein said reaction vessel is part of an array.

30. **(Previously Presented)** The method of Claim 22, wherein said first temperature differential of at least 10°C is established within said convection cell.

31. **(Previously Presented)** The method of Claim 22, further providing at least one microdroplet channel wherein said microdroplet channel is in fluid communication with said reaction vessels.

32. **(Currently Amended)** A method, comprising:

- a) providing:
 - i) a plurality of reaction vessels comprising a top and a bottom;
 - ii) a heat source contacting said bottom of said reaction vessels;
 - iii) an active cooling means contacting said top of said reaction vessels; and
 - iv) a solution comprising a plurality of nucleic acids comprising a target and a primer substantially homologous to at least a portion of said target;
- b) introducing said solution into a first reaction vessel comprising a first temperature differential between said top and said bottom, wherein
 - i) said first temperature differential is produced by simultaneously heating said bottom with said heat source and cooling said top with said cooling means,
 - ii) said heating produces spatially uniform temperature and temporally uniform temperature across said fluid in said top of said reaction vessel, and
 - iii) said cooling produces spatially uniform temperature and temporally uniform temperature across said fluid in said bottom of said reaction vessel;
- c) transferring said solution from said first reaction vessel to a second reaction vessel wherein said second reaction vessel comprises a second temperature differential between said top and said bottom; and
- d) transferring said solution from said second reaction vessel to said first reaction vessel under such conditions that said nucleic acids form an amplified nucleic acid.

33. **(Previously Presented)** The method of Claim 32, wherein said reaction vessels comprise at least one material selected from the group consisting of Plexiglas™, glass, plastics, silicones and metal.

34. **(Previously Presented)** The method of Claim 32, wherein said reaction vessels are part of an array.

35. **(Previously Presented)** The method of Claim 32, wherein a temperature differential of at least 5°C is established between said top surface and said bottom surface.

36. **(Previously Presented)** The method of Claim 32, also providing at least one microdroplet channel wherein said microdroplet channel is in fluid communication with said reaction vessel.

37-44. **(Canceled)**

45. **(Currently Amended)** A method, comprising:

- a) providing:
 - i) a plurality of reaction vessels comprising a top and a bottom;
 - ii) a heat source contacting said bottom of said reaction vessel vessels, and
 - iii) a solution comprising a plurality of reactants;
- b) introducing said solution into a first reaction vessel comprising a first temperature differential between said top and said bottom, wherein
 - i) said first temperature differential is produced by simultaneously heating said bottom with said heat source and cooling said top with said cooling means,
 - ii) said heating produces spatially uniform temperature and temporally uniform temperature across said fluid in said top of said reaction vessel, and
 - iii) said cooling produces spatially uniform temperature and temporally uniform temperature across said fluid in said bottom of said reaction vessel;

- c) transferring said solution from said first reaction vessel to a second reaction vessel wherein said second reaction vessel comprises a second temperature differential between said top and said bottom; and,
- d) transferring said solution from said second reaction vessel to said first reaction vessel under conditions such that said reactants form a reactant product.

46. **(Previously Presented)** The method of Claim 45, wherein said reactants comprise i) nucleic acid comprising a target and ii) primers substantially homologous to at least a portion of said target.

47. **(Previously Presented)** The method of Claim 45, wherein said reactant product comprises amplified nucleic acid.

48. **(Previously Presented)** The method of Claim 45, wherein said reaction vessels comprise material selected from the group consisting of Plexiglas™, glass, plastics, silicones and metal.

49. **(Previously Presented)** The method of Claim 45, wherein said reaction vessels are part of an array.

50. **(Previously Presented)** The method of Claim 47, wherein said second temperature differential is at least 5°C.

51. **(Previously Presented)** The method of Claim 47, wherein said first temperature differential is at least 10°C.

52. **(Previously Presented)** The method of Claim 47, further providing at least one microdroplet channel wherein said microdroplet channel is in fluid communication with said reaction vessel.

53. (New) A method, comprising:
- a) providing:
 - i) a plurality of reaction vessels having a top and a bottom configured with an aspect ratio of at least 3.3, wherein said ratio is defined as vessel height divided by vessel diameter,
 - ii) a heat source contacting said bottom of said reaction vessels,
 - iii) a cooling means contacting said top of said reaction vessels, and,
 - iv) a solution comprising a plurality of reactants,
 - b) introducing said solution into a reaction vessel, and
 - c) simultaneously heating said bottom with said heat source and cooling said top with said cooling means to produce a temperature differential between said top and said bottom, wherein
 - i) said heating produces spatially uniform temperature and temporally uniform temperature across said fluid in said top of said reaction vessel, and
 - ii) said cooling produces spatially uniform temperature and temporally uniform temperature across said fluid in said bottom of said reaction vessel.
54. (New) A method, comprising:
- a) providing:
 - i) a plurality of reaction vessels comprising a top and a bottom,
 - ii) a heat source contacting said bottom of said reaction vessels,
 - iii) an active cooling means contacting said top of said reaction vessels, and
 - iv) a solution comprising a plurality of nucleic acids comprising a target and a primer substantially homologous to at least a portion of said target;
 - b) introducing said solution into a reaction vessel;

- c) simultaneously heating said bottom with said heat source and cooling said top with said cooling means to produce a temperature differential between said top and said bottom, wherein
 - i) said heating produces spatially uniform temperature and temporally uniform temperature across said fluid in said top of said reaction vessel,
 - ii) said cooling produces spatially uniform temperature and temporally uniform temperature across said fluid in said bottom of said reaction, and
 - iii) said target nucleic acid is amplified.

55. (New) A method, comprising:

- a) providing:
 - i) a plurality of reaction vessels comprising a top and a bottom,
 - ii) a heat source contacting said bottom of said reaction vessels, and
 - iii) a solution comprising a plurality of reactants,
- b) introducing said solution into a reaction vessel,
- c) simultaneously heating said bottom with said heat source and cooling said top with said cooling means to produce a temperature differential between said top and said bottom, wherein
 - i) said heating produces spatially uniform temperature and temporally uniform temperature across said fluid in said top of said reaction vessel,
 - ii) said cooling produces spatially uniform temperature and temporally uniform temperature across said fluid in said bottom of said reaction vessel, and
 - iii) said reactants form a reactant product.

56. (New) The method of Claim 22, wherein said first reaction vessel is selected from the group consisting of circular vessel and oval vessel.

57. (New) The method of Claim 32, wherein said first reaction vessel is selected from the group consisting of circular vessel and oval vessel.

58. (New) The method of Claim 45, wherein said first reaction vessel is selected from the group consisting of circular vessel and oval vessel.

59. (New) The method of Claim 53, wherein said reaction vessel is selected from the group consisting of circular vessel and oval vessel.

60. (New) The method of Claim 54, wherein said reaction vessel is selected from the group consisting of circular vessel and oval vessel.

61. (New) The method of Claim 55, wherein said reaction vessel is selected from the group consisting of circular vessel and oval vessel.